Indian Institute of Technology Kanpur

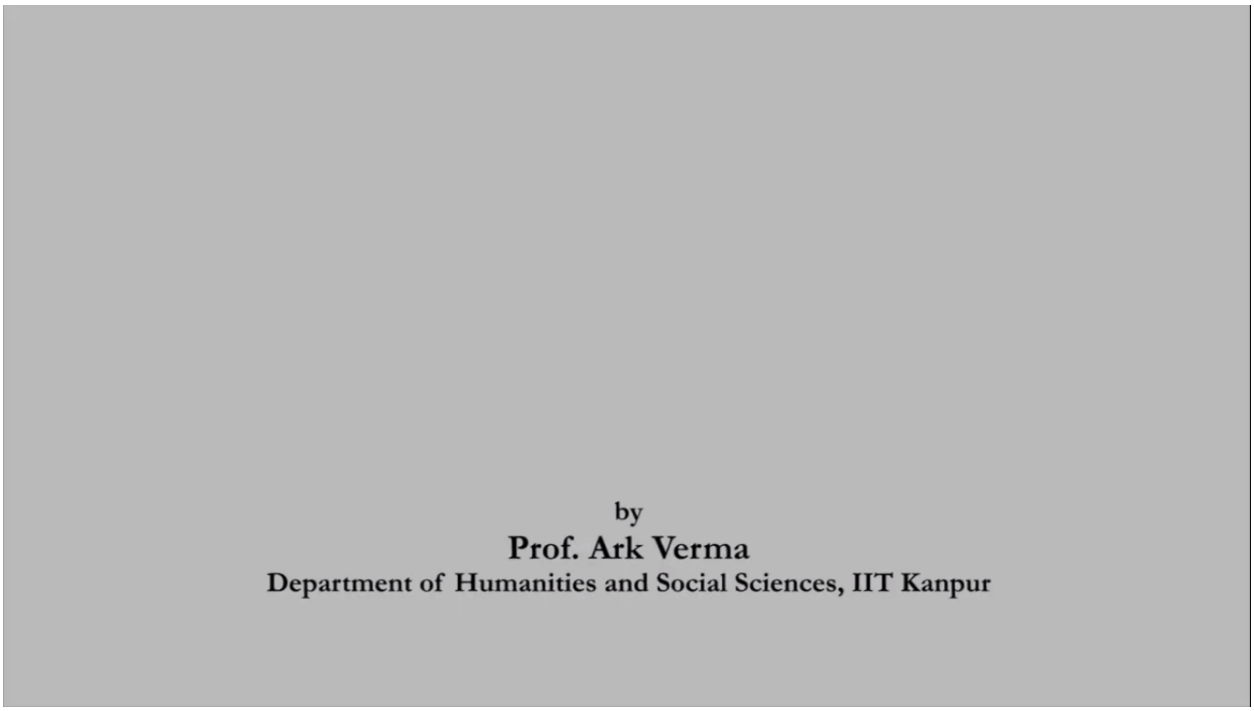
National Programme on Technology Enhanced Learning (NPTEL)

Course Title

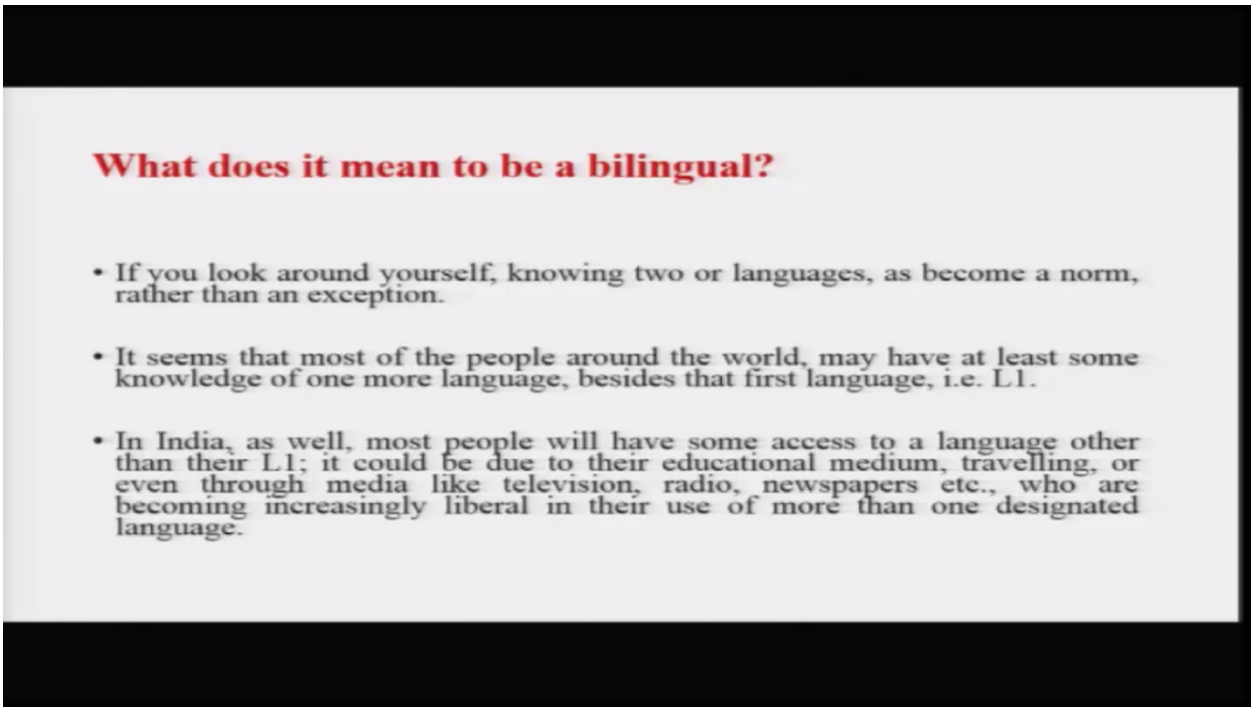
Introduction to the Psychology of Language

Lecture - 36

Bilingualism - 1



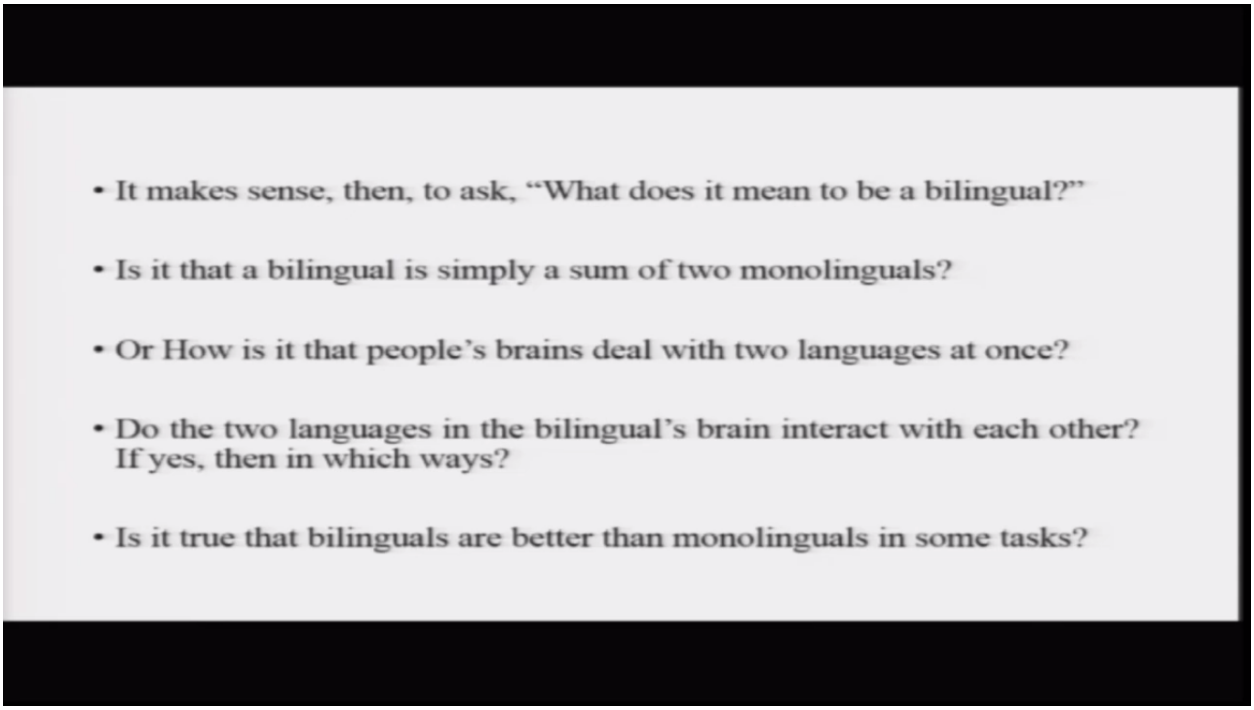
Hello and welcome to the course introduction of the psychology of language. I am Ark Verma from ITI Kanpur and we are in the final week of the course now. In this week I would like to talk to you about bilingualism. We've talked about various aspects of language starting from acquisition, production, comprehension also about sentence processing and stuff but most of that discussion or all of that discussion actually have been in reference to people who know and process only one language. However, if you look around yourself you'd know that a lot of us know more than one language. So any understanding of language and its processes the component processes that we have talked about should in some sense also kind of take into account situations and scenarios when the speakers or the persons involved are knowledgeable or are using more than one language. So that is the goal of this week's lectures. What I will be doing is I'll probably not be going into a lot of detail because that's in fact something that is a matter of a full course to teach but I'll kind of try and sort of superficially cover some of the major issues that pop up when you're trying to discuss about bilingualism.



Now as I was saying if you look around yourself people there are more number of people who know more than one language and use more than one language comfortably. If you look around say for example at the level of the entire world say for example there are continents like Europe also say for example closer to home in India people anybody who travels a little bit, anybody who has access to a reasonable education say for example a lot of students at least go to one a English medium school and so on say for example they have some knowledge of their L1 which is their regional or which is mother tongue their first language and also the language of the region but usually they say for example by virtue of education, occupation, traveling they get to know some of the other languages as well. People in India usually for example there are so many different states and each state has its own language probably they know their state language, their regional language and English in addition. Some people say for example even from the southern states or from the northeastern states might know Hindi in addition but that kind of in some sense if you look at it complicates the situation and it kind of creates a situation where as a psycho linguist or as somebody who's interested in the psychology of language especially when we are talking about people who use and communicate using this language you are kind of tempted to ask is language processing or is comprehension production of language equivalent in people who know only one language and one language by itself or say for example if they know at least two to three languages in some cases.

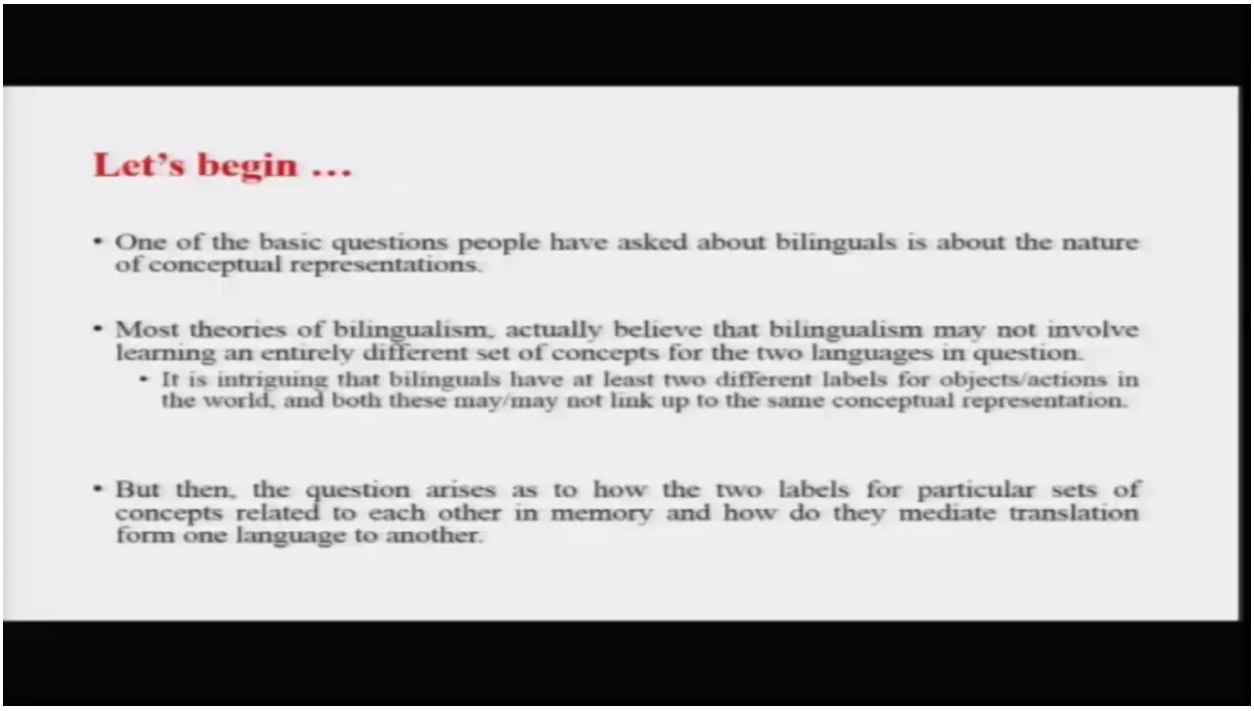
That is something which is very interesting and fascinating about bilingualism. So the final thing that I wanted to add was about this new advent of new media of say for example getting awareness in different kinds of languages say for example if you talk about social media stuff say for example Facebook, Twitter, Instagram, Whatsapp you kind of people get exposed to material from more than their own native language certainly and that is also in some sense kind of making people forcibly aware of more than just their native language. Now all of this together kind of creates a very interesting scenario. It creates some very interesting questions as well and questions could be something like say for example what does it mean to be called a bilingual. If

somebody calls you that you are a bilingual or say for example you are a multilingual what does it actually mean.



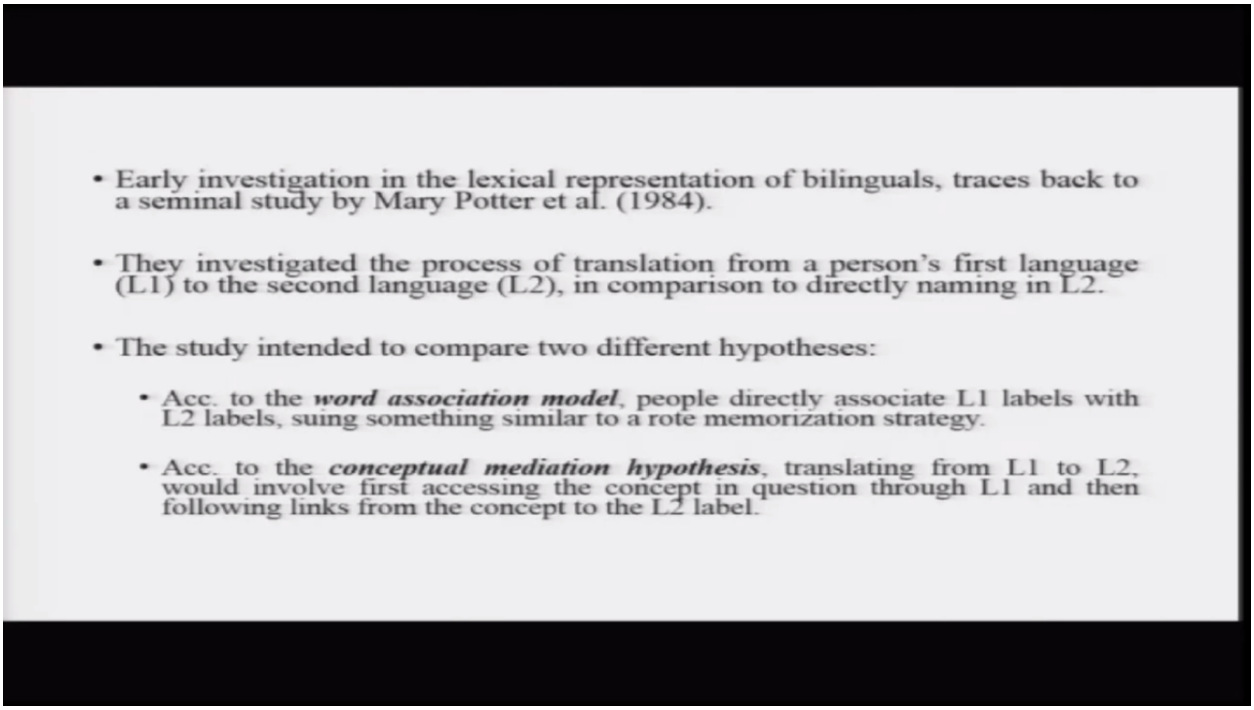
Is it say for example that you have two separate systems of language in yourself say for example I know at least Hindi and English will that mean that I have entire fully developed system of Hindi and complementing that is an entire fully developed system of English? Is it just two more – is a bilingual as sum of two monolinguals or say for example if there is a multilingual person there are how many language sets a person would have. Also say for example how does the brain deal with the multiple languages at the same time say for example we've talked about in the last week itself we've talked about the cognitive neuroscience related to language processing. Now how does that system get complicated say for example if you know two languages or if you know four languages, five languages how are the brain areas which are responsible for processes like lexical access, processes like production of language how do those areas cope up with this kind of variety of options that are available. So these are some of the questions that are there. Also say for example in the same person another very important question is in the same person if there are two or three or four languages available do these languages also interact within each other say for example and in taking my own example I know Hindi and English. Do I sometimes mix Hindi and English in speak. Do I sometimes intend to speak in English but I say for example by mistake speak in Hindi and do I use English words in Hindi sentences or Hindi words in English sentences, how does it really happen. You are aware of say for example levels model of speech production and we talked about conceptual representation, lemma selection, lexical selection, phonological encoding, morphological encoding and so on. If I have to speak at what stage the representation from the two languages will start getting mixed up. So all of these kind of questions really create a very interesting situation that is to be answered and that is to be understood by people who are interested in understanding how language really is.

Finally one question that kind of arises out of a lot of now not so recent but a lot of research that has happened in bilingualism and multilingualism and you might be hearing of them say for example in pop science and other kinds of places also in genuine journals if you read them is that bilingualism bilinguals or multilinguals for that matter are supposed to be at some advantage in doing particular cognitive tasks as opposed to people who know just one language and this body of research is almost 20-30 years old now and people are kind of coming up with very interesting – have been coming up with very interesting proposals that you know if you're a bilingual you're better at say for example memory tasks or you're better at response selection tasks and a lot of people have said that if you are bilingual you will be relatively preserved from the effect of dementia or Alzheimer's and so on so this is a very interesting body of research that basically centers around these kind of questions. As I already said I will probably not be able to cover all of these topics in as much detail as I would like to but I just wanted to give you a flavor of some of these topics and then maybe we can explore this at a later point.



Now one of the basic questions that people could ask about bilinguals is about the nature of conceptual representations. Now as a bilingual again I can take just my example I know that for example this here is a pen and also can be called kalam or if I were holding an apple in my hand I know this is an apple and this is called seb in Hindi and similarly for so many other objects and events and actions that are going around me. For everything that is there in this world and given that I have reasonably proficiency in both of the said languages I will have at least two ways to access them. I will have two sets of phonological representations to access them and them basically is the conceptual representation. So the idea is that we have as bilinguals we would have at least two set of distinct labels for each concept that is there in this world. And this is very

interesting. Interesting in the sense that you to us that how's the brain dealing with this. That is suppose one lock and there are two keys to this lock. How is this coordination going to happen?



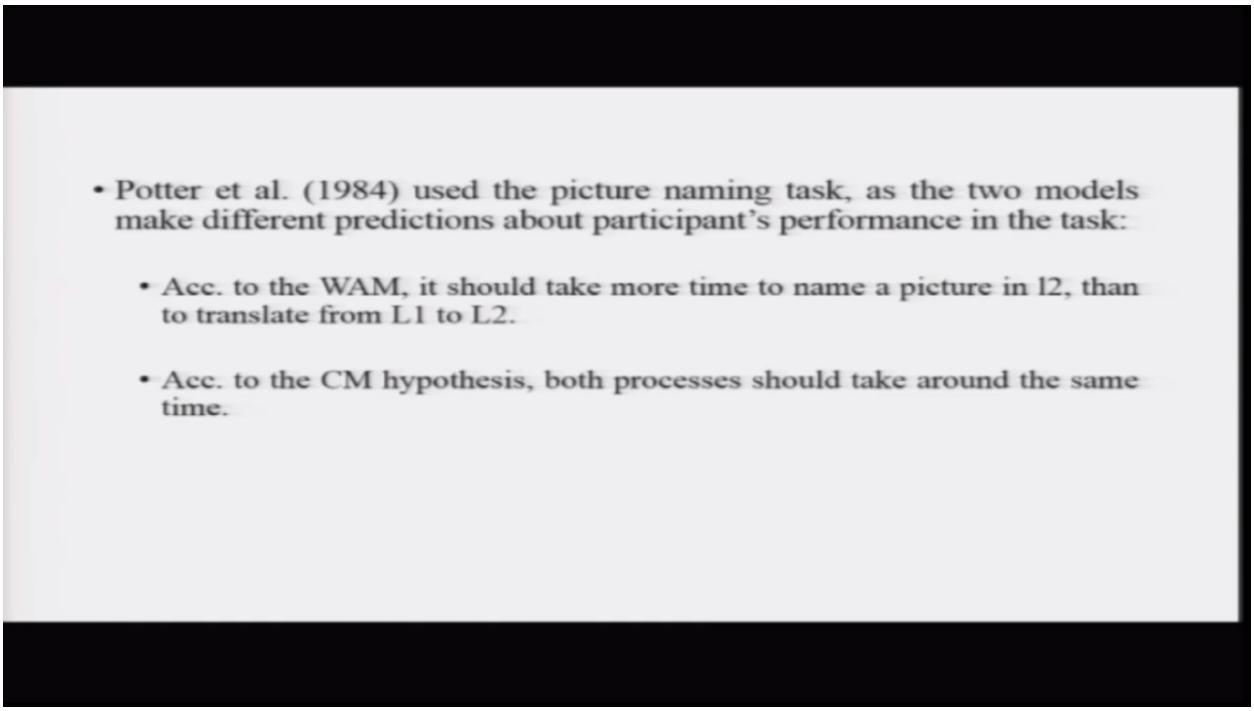
We'll say for example both the keys not one to come and get used at the same time. When you're looking at an apple a picture of an apple and you want to name it in both in English and Hindi at the same time will there be interference or competition between these two things. This is an interesting question and what basic research kind of tells us is that people do not really have separate labels for each of the concept. I mean they do not really build up separate sets of concepts in both the languages. The concept is the same. The labels are just two different labels accessing the same concept but then you can ask how are these labels related to each other in memory because every time you will invoke the picture of this concept via one of these labels the other label will inadvertently get activated. Now how is that interaction going to be? Early investigation into this question was basically can be traced back to Mary Porter and colleagues who researched this topic in the year 1984 and what they basically were trying to do was that they were trying to check how the concepts are linked to labels from the first language and the second language and they kind of wanted to investigate by using two tasks. I'll talk to you about the tasks as well one of the tasks was a translation tasks from L1 to L2 and the other task was a picture naming tasks in the second language. So L1 is first language I will be using this again and again L1 is the first language, the language in which the child is born. So it typically is the mother's language that is why it's called mother tongue because it is the language that the child gets most exposure to and ends up learning first and foremost. So that is how you can crudely define what native language is. Then there is the second language which the child acquires later. It could be at a very early age from two to three years or even earlier suppose say for example there are two parents both are speaking different languages or say for example later in school children say for example in our part of the world get admitted to English medium schools. So a

child could be being a born and brought up in a Hindi speaking family completely but then gets admitted to a school that is fully English medium. So from the school age two and a half three three and a half years of age till rest of the education the child gets proper education and instruction in English. End of school life the child probably knows both English and Hindi equally well because Hindi education as anyways been going back at home an English education mostly happens in schools. So this is basically that concept and what basically people were asking in this study Mary Potter and colleagues what they actually wanted to test was that how do people know link the concepts in their L1 and L2 and they used two task one was a picture naming tasks in L2 that is the second language. One of them was the translation tasks from L1 to L2.

Now they were actually trying to test two different hypotheses. The first one was the word association hypothesis or the word association model whatever you might want to call it. The word association model actually proposes that people directly associate L1 labels to L2 something like say for example which is very similar to what is called a rote memorization. What is rote memorization? Suppose I want to name this particular object here. I know that in Hindi or in my language that is called kalam but I want to also remember the English name for it. What will I do is I will basically just remember kalam is equals to pen, kalam is equals to pen our say kalam is also called pen something like that and what am I doing actually here is I am not really establishing a link from the concept to the L2 label what I am doing is I am just establishing a link between the L1 label and the L2 label.

So this is basically what the word association model release says and it says that this is usually done through a rote memorization strategies. For example actually you can see something of this kind happening when you try to teach the second languages to people who are slightly older in age and they don't really want to go through this entire gamut of learning English and there is probably not so much time as well and people say for example you have not gotten English medium education and at a later age they want to learn it a lot of people you will see they will kind of come up with these books and the books will have the Hindi names and English names of things and what they do is they just kind of associate this by a rote memorization. This is what the word association model says actually happens.

There's another competing model called the conceptual mediation model or the conceptual mediation hypothesis which says that basically what really happens is that there are links from the conceptual label, the conceptual representation to the L2 label as well and translating from the first language to the second language that is translating from L1 to L2 basically in would involve first accessing the concept in question through L1 and then following the links from the concept to L2. So not really from L1 to L2 directly but L1 concept and then L2. This is what the two models proposed.



Now Potter and colleagues use this picture naming tasks as I said in L2 and because the two models posited or proposed different theories they also made different predictions about the picture naming and the translation tasks. What are the predictions? According to the word Association model. It should take more time to name a picture in L2 as compared to translating from L1 to L2. On the contrary the conceptual mediation hypothesis says that it should take equal amount of time regardless of whether you are translating or naming a picture directly in L2. This is how those the two models look.

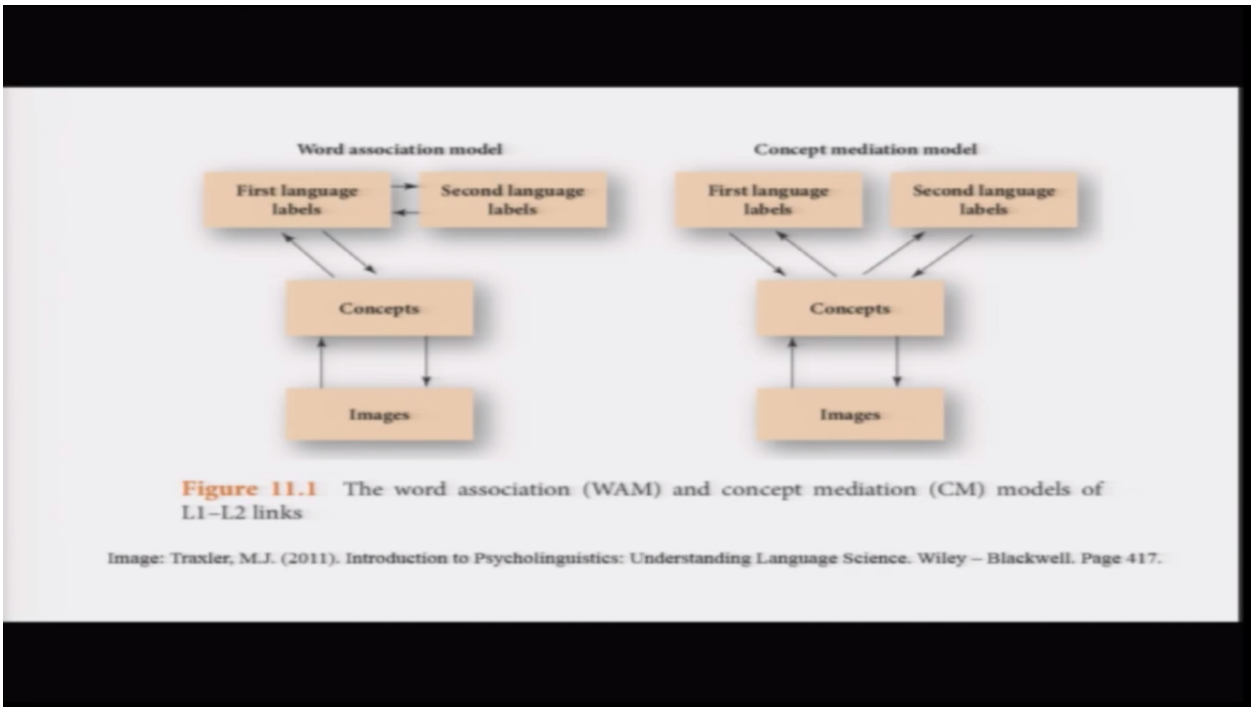
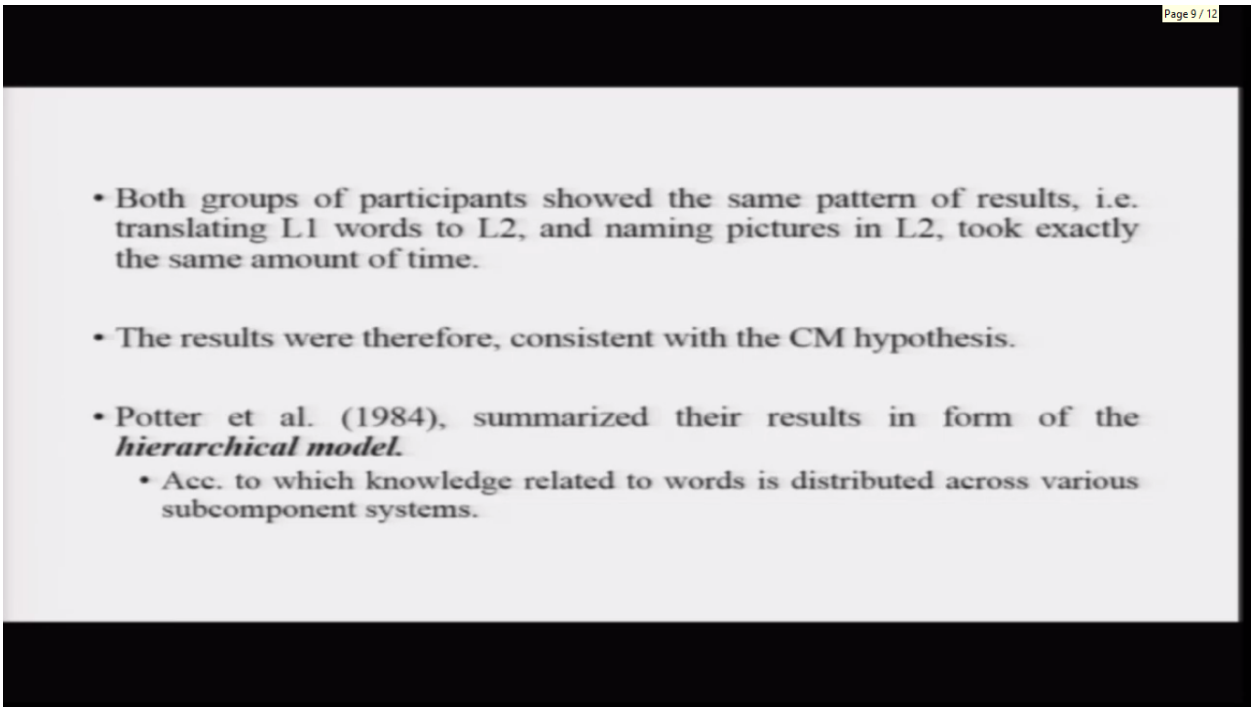


Figure 11.1 The word association (WAM) and concept mediation (CM) models of L1–L2 links

Image: Traxler, M.J. (2011). Introduction to Psycholinguistics: Understanding Language Science. Wiley – Blackwell. Page 417.

The image is being borrowed from Traxler you can see say for example in the model in the left hand side which is the word association model basically there are no links between the concept label and the second language labels whereas on the right hand side in the concept mediation model there are links between the concepts and the first language and the second language labels as well. Now why do the models make these predictions? We'll talk about that in a bit. Now Potter and colleagues basically used two Chinese English bilinguals to do these tasks name the pictures in English and also translate matching Chinese words from the same concepts to English. So L1 to L2 translation and L2 picture naming.

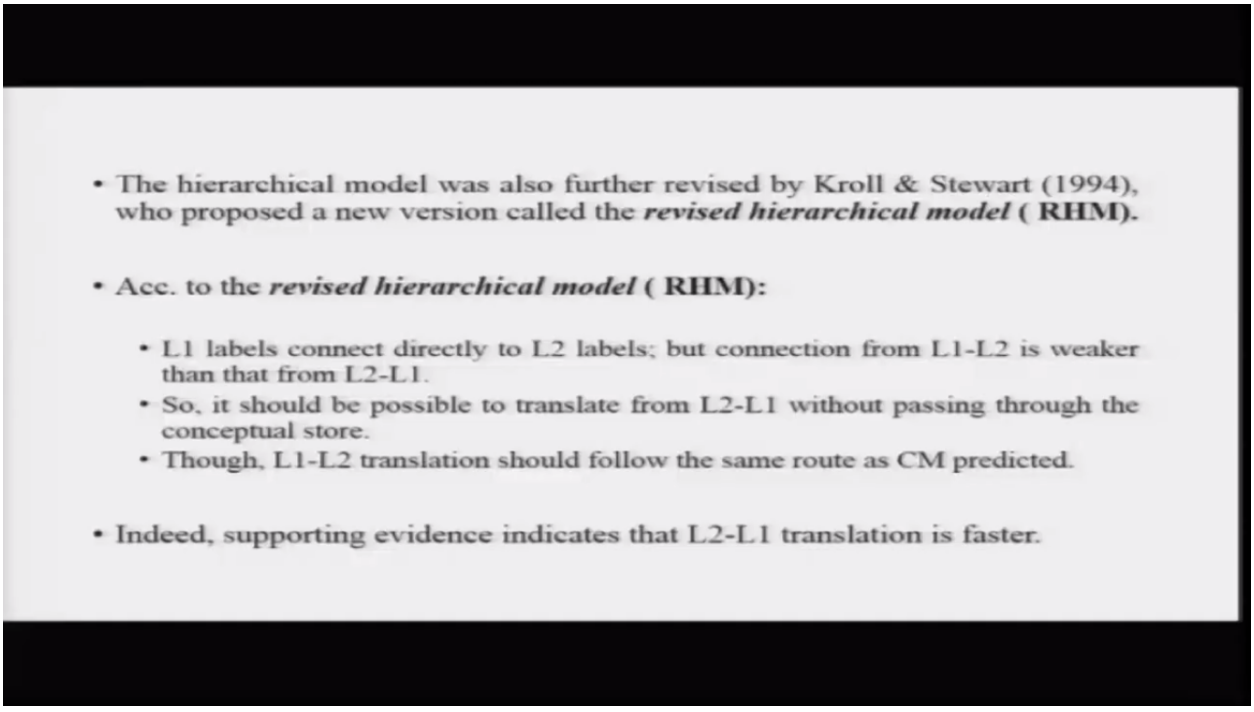
In a different experiment low proficient or a beginner label English French bilinguals perform the same kind of task but they did this in French instead of English. So their second language was slightly different.



Now what did they find out? So even even before that we can actually talk about why did they make these kind of predictions. According to the word association model what is actually happening is if you have to name a picture in L2 what will you actually do is you'll recognize the picture, you'll kind of go to the L1 label. You'll activate the L2 label, you'll come back from there and then create the output. If you have to just translate from L1 to L2 you basically just need to look at the L1 word form and the L1 word form will automatically activate the L2 word form because they are heavily associated by learning and in that sense the number of steps in translation will be lesser than the number of steps for naming a picture in L2. I will repeat that just for reference. In naming – for naming a picture in L2 you will basically need to look at the picture, activate the related concept real representation, from the conceptual representation you activate the L1 label. From the L1 label you directly go to the L2 label and you come back and give the output. Note that there is no link between the conceptual representation and the L2 label in this particular model. Because there will be large number of steps here as compared to say for example if you have to just translate from L1 to L2 you basically have to just and look at L1 label associate a matching L2 label and create the output. So the number of steps in translation are lesser than the number of steps in L2 naming. That is why they say that L2 naming will be slower than translation.

In the other model because the number of steps are same even if you're translating or if you are just naming there are these links between the first language labels and second language labels. And there's are no links between first languages labels and second language labels here. The first language labels and concepts second language labels and concepts. So you go from first language, go to concept, go to second language. Either you're doing picture naming in L2 or you're doing translation. So this kind of leads to the prediction that either you're doing translation are you doing L2 naming the timing will be the same. This is what the two models predicted.

Now the results basically actually favored the explanation that was given by the concept mediation model. So both groups of participants English, French, and Chinese, English bilingual showed the same pattern of results that was the translating from L1 words to L2 and naming pictures in L2 took exactly the same amount of time. The results therefore as I said were more favorable to the concept mediation hypothesis. Potter and colleagues sort of understood this results and they summarize their results in form of a model that was known as the hierarchical model of bilingual.



The hierarchical model basically says that this kind of results could appear because the knowledge about the word forms was distributed across the various sub components and in that sense it kind of took an equivalent amount of time regardless of the task at hand. However, the hierarchical model was also later revised almost 10 years later by Kroll and Stewart and they basically posited a new model which has been called the revised hierarchical model. How is this model structured. I will show the figure to you very shortly but this model basically says that L1 labels connect directly to L2 labels but connections from L1 to L2 are slightly weaker than connections from L2 to L1. I will show that. So if this is the case it could be possible to translate from L2 to L1 without passing through the conceptual store and hence translation could be a little bit faster. And similarly L1 to L2 translation should also kind of follow the same kind of fruit.

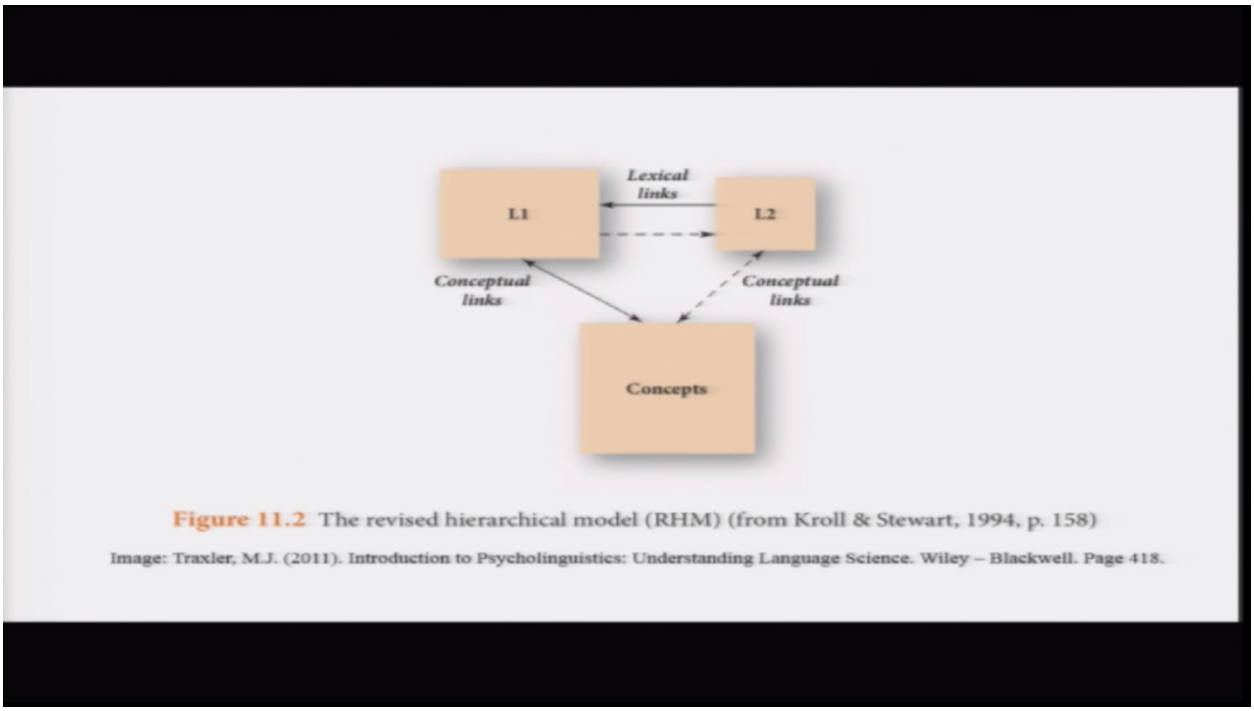
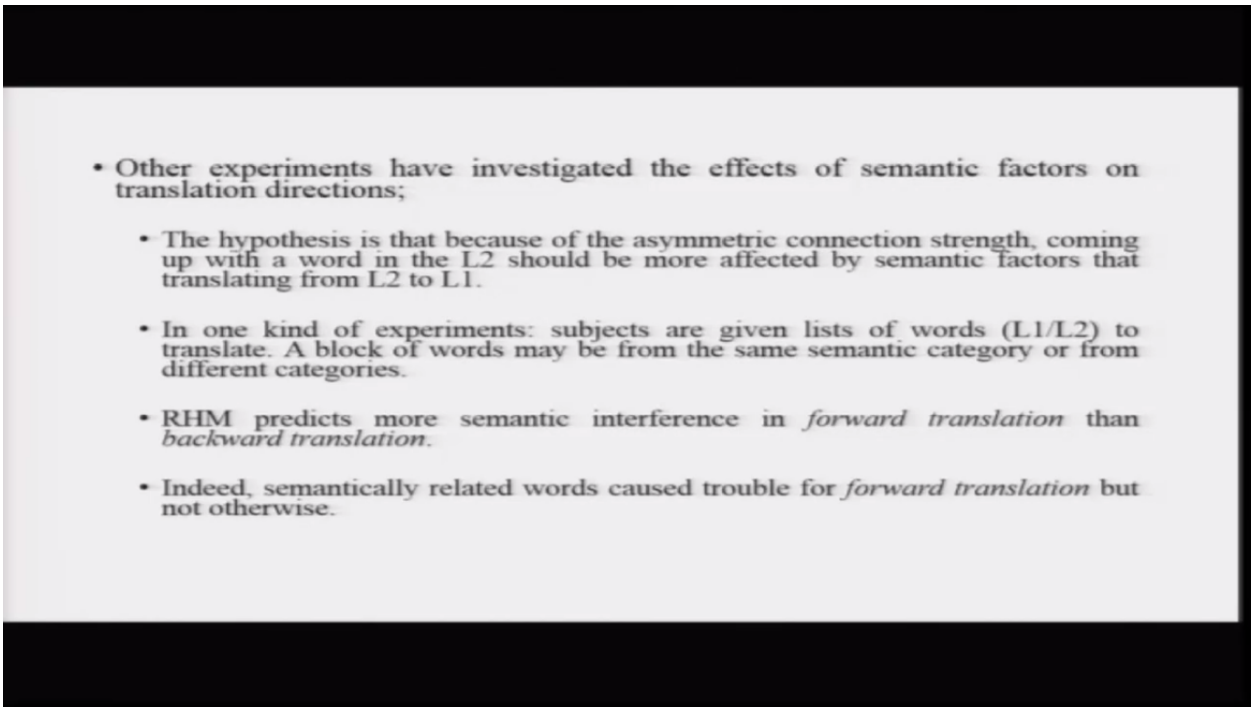


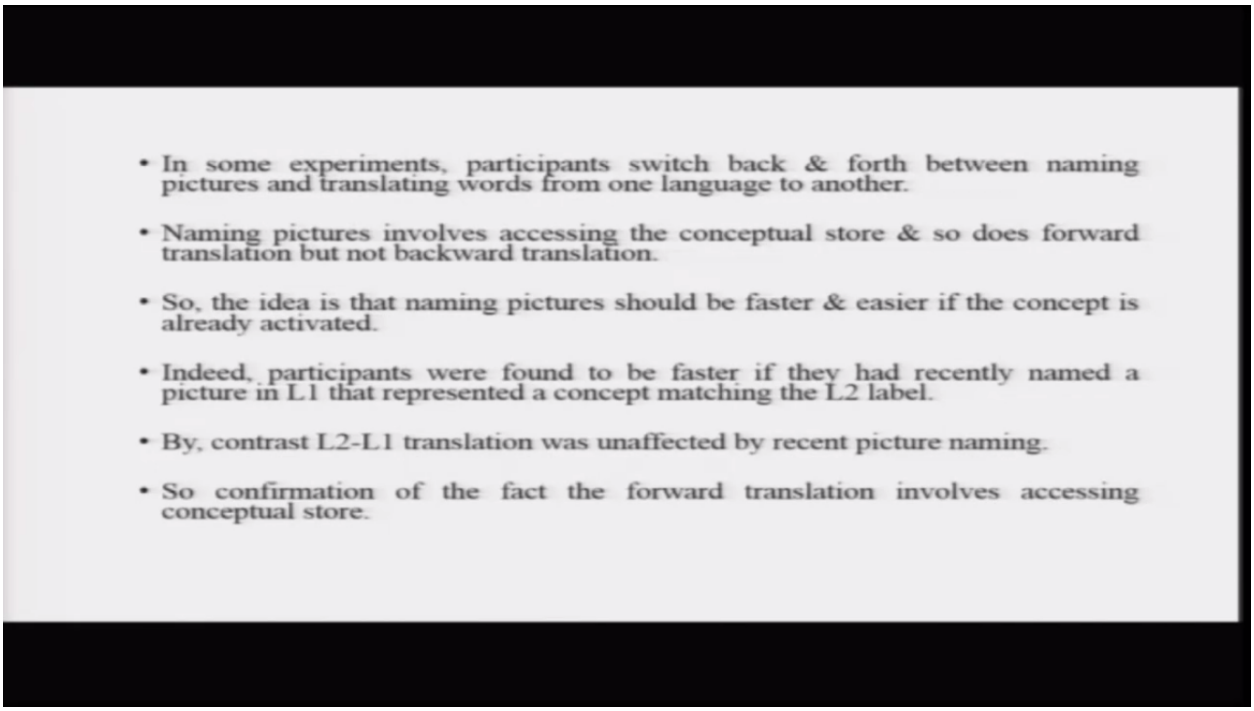
Figure 11.2 The revised hierarchical model (RHM) (from Kroll & Stewart, 1994, p. 158)

Image: Traxler, M.J. (2011). Introduction to Psycholinguistics: Understanding Language Science. Wiley – Blackwell. Page 418.

Now they did some of the experiments to check the predictions from this module and they found actually that L2 to L1 translation is actually faster as compared to L1 to L2 translation. Let's look at the model here. Just look at the model L2 to L1 links and L1 to L2 links and then you see their links between L2 and the concepts and L1 and the concepts. So L2 to L1 translation you can see that the link is a slightly stronger and L1 to L2 transferring the link is slightly weaker. So this is kind of what explains that L1 to L2 translation basically is --shall be slightly weaker or slower as compared to L2 to L1 translation.



This is what the revised hierarchical models said. Also there is some more evidence about what the revised hierarchical model has to say and they did some more experiments. The hypothesis being say for example that because of this asymmetric connection strength between L1 and L2 connections because L2 to L1 is very strong L1 to L2 is slightly weaker the idea was that people propose that coming up with a word in L2 should be more affected by semantic factors. So we've talked about priming and we've talked about effects of priming in naming and comprehension and this is basically what they suggested. In one kind of experience what they did was they kind of gave subjects a list of words to translate. The list could be in L1 or in L2 and they have to translate in it into the other language. A block of words here could be some time from the same semantic category or from different category. So you can give a list of all fruits or you can give a list of half fruits half vegetables or say for example, half fruits, half animals and so on. Now the revised hierarchical model actually predicted that more semantic interference should happen in forward translation that is L1 to L2 translation rather than backward translation that is from L2 to L1 translation. This is again as I said based on the proposition that they have that L1 to L2 links are weaker as compared to L2 to L1 links. Indeed this was found. Semantically related words caused more trouble for forward translation as opposed to backward translation. So that is again something that they took as supporting the revised hierarchical model.



In some other experiments they actually asked participants to switch back and forth between naming pictures and translating words from one language into other and they found that naming pictured involves accessing the conceptual store and so does forward translation but backward translation does not really require accessing the conceptual store. So the idea is that then if you agree with this the idea would be that naming pictures would be faster and easier if the concept is already activated and they actually kind of primed parts once activated these concepts and so that participants will be faster if they had recently named a picture in L1 that represented a concept matching the L2 label. So for example if there is a picture of a pen or an apple and you've named the picture in your first language or you can say for example it could be the same concept or a concept that is semantically related. So this is what they proposed and they actually found that. by contrast L2 to L1 translation was not really heavily affected by these semantic factors because the connection is so very strong L2 labels are directly and strongly connected to L1 labels and that truth therefore is not really affected by these semantic factors. Again sort of supporting the revised hierarchy model.

So this is all about how the conceptual representation is between the two languages. Again I have not really covered this whole thing in a lot of detail. I just wanted to give you an idea about what is the current extent of models with respect to how conceptual representation is specified between the two languages. So we talked about the word association model. We talked about the concept mediation hypothesis and we talked a little bit about the revised hierarchical model.

To sum up the idea is that L1 to L2 connections are weaker. L2 to L1 connections are stronger both still have connections to the conception store and say for example forward translation might be slightly slower as compared to backward translation.

Thank you.